FLUKE®

Instruction Sheet

80PK-4

Type K Air Probe

WARNING

TO AVOID ELECTRICAL SHOCK, DO NOT USE THIS PROBE WHEN VOLTAGES EXCEEDING 24V AC RMS OR 60V DC ARE PRESENT. THE PROBE TIP IS ELECTRICALLY CONNECTED TO THE OUTPUT TERMINALS.

INTRODUCTION

The 80PK-4 Type K Air Probe is designed for measuring the temperature of air or gases. The measuring bead of the probe is protected by a perforated stainless steel baffle to prevent accidental damage. The sheath material is high temperature Inconel. The 4-foot cable is terminated with a Type K miniature thermocouple connector with 0.792-mm (.312-inch) pin spacing. The 80PK-4 can be used with any temperature-measuring instrument that is designed to accept Type K thermocouples and has a miniature connector input.

SPECIFICATIONS

Type: K Special Grade Ni-Cr vs Ni-Al (Chromel vs Alumel).

Measurement Range: -196°C to 816°C (-320°F to 1500°F)

Accuracy (with respect to NBS tables):
Note: All error calculations should be done in °C, then scaled to °F.

RANGE	ACCURACY (% of reading)
-196°C to -110°C (-320°F to -166°F)	± 2% (°C)
-110°C to -40°C (-166°F to -40°F)	±2.2°C
-40°C to 275°C (-40°F to 527°F)	±1.1°C
275°C to 816°C (527°F to 1500°F)	±0.4% (°C)

Output: @ 25°C (77°F) = 1.00 mV (reference junction at 0°C)

Seebeck Coefficient: @ 25°C (77°F) = 40.50 μV/°C

Measurement Time (Time Constant): 0.3 seconds for air at a mass velocity of 22.5 kg/sec/.09m^2 (50 lb/sec/ft^2), (5 time constants = 1 complete step change, i.e., 1.5 seconds)

Maximum Voltage: 24V ac rms or 60V dc

Maximum Temperature of Tip: 816°C (1500°F)

Baffle:
Material: 316 Stainless Steel
Dimensions:
Diameter: 5.6 mm (0.220 in)
Length: 3.8 cm (1.5 in)

Sheath:
Material: Inconel
Dimensions:
Diameter: 3.175 mm (⅛ in)
Length: 17.15 cm (6.75 in) from handle body to end of baffle

Cable:
Length: 1.2 meters (4 ft)
Insulation:
Material: PVC
Maximum Temperature: 105°C (220°F)

Conductors:
Type: K
Size: AWG #24 stranded (7 strands of #32)
Length: 122 cm (48 in) nominal

Polarity and Color Coding:
Chromel: + yellow
Alumel: - red
Outer Jacket: black

Handle:
Material: Teflon
Maximum Temperature: 204°C (400°F)

Connector:
Type: yellow mini-thermocouple connector with 0.312-inch pin spacing
Material: Hytrel
Maximum Temperature: 150°C (302°F)

Overall Length: 24.75 cm (9.75 in) from baffle tip to end of cable strain relief

Protection: Class 3. Relates solely to insulation and grounding properties defined in IEC 348.

MEASUREMENT CONSIDERATIONS

Instrument Compatibility

The 80PK-4 is designed to be compatible with any temperature-measuring instrument that accepts Type K thermocouples, has a miniature thermocouple connector, and has cold reference junction compensation. Accuracy of the temperature-measuring instrument must be considered along with the 80PK-4 accuracy specification to determine the overall accuracy of the combination.

Temperature Limitations

The baffle tip of the 80PK-4 has a continuous temperature rating of 816°C (1500°F). However, the opposite end of the sheath nearest the handle should not be subjected to temperatures greater than 204°C (400°F). This is the maximum temperature limitation of the handle.

Media Limitations

The stainless steel baffle should not be exposed to halides or sulfides. The sheath material of the 80PK-4 is Inconel, an alloy of chromium and nickel. The sheath has excellent resistance to oxidation and corrosion at high temperatures, but it should not be used in the presence of sulfur above 537°C (1000°F). Do not immerse the probe in liquid or saturated vapor (because of the open access to the inside of the sheath via the exposed bead). Immersing the probe in liquid or saturated vapor could result in wicking of the substance and possible corrosion of the probe. The 80PK-4 should not be used in reducing atmospheres or in a vacuum.

OPERATION

Use the 80PK-4 as follows:

1. Connect the 80PK-4 to a compatible Type K temperature-measuring instrument using the miniature (0.312-inch spacing) thermocouple connector.

2. Turn on the measuring instrument and select the appropriate range and scale.

3. Check the readout on the measuring instrument. With no heat or cold source applied to the bead, the measuring instrument should display the ambient (room) temperature. If the instrument does not read out properly, refer to the TROUBLESHOOTING paragraphs that follow.

MEASURING TECHNIQUE

The 80PK-4 Air Probe should be inserted at least 6.35 cm (2.5 in) into the environment to be measured to minimize the shunting effect of the sheath.

TROUBLESHOOTING

With no heat or cold applied to the probe, the measuring instrument should display the ambient temperature. If the measuring instrument does not read out properly, try the following:

1. Verify that the temperature-measuring instrument is designed to be used with Type K thermocouples. The measuring instrument should have a yellow input connector and/or be marked with a "K".

2. Check for an open circuit indicator on the measuring instrument. Some temperature measuring instruments have a built-in circuit to indicate if the connected probe is open. (All Fluke temperature-measuring instruments have this feature.) Refer to the measuring instrument's manual to see if this feature is available.

   Short the two input pins of the measuring instrument with a piece of wire. If the instrument is functioning, it should indicate the ambient temperature.

3. If you suspect a broken connection, use an ordinary ohmmeter to read the continuity of the probe from pin to pin. The ohmmeter should read 20 ohms or less if there is continuity.

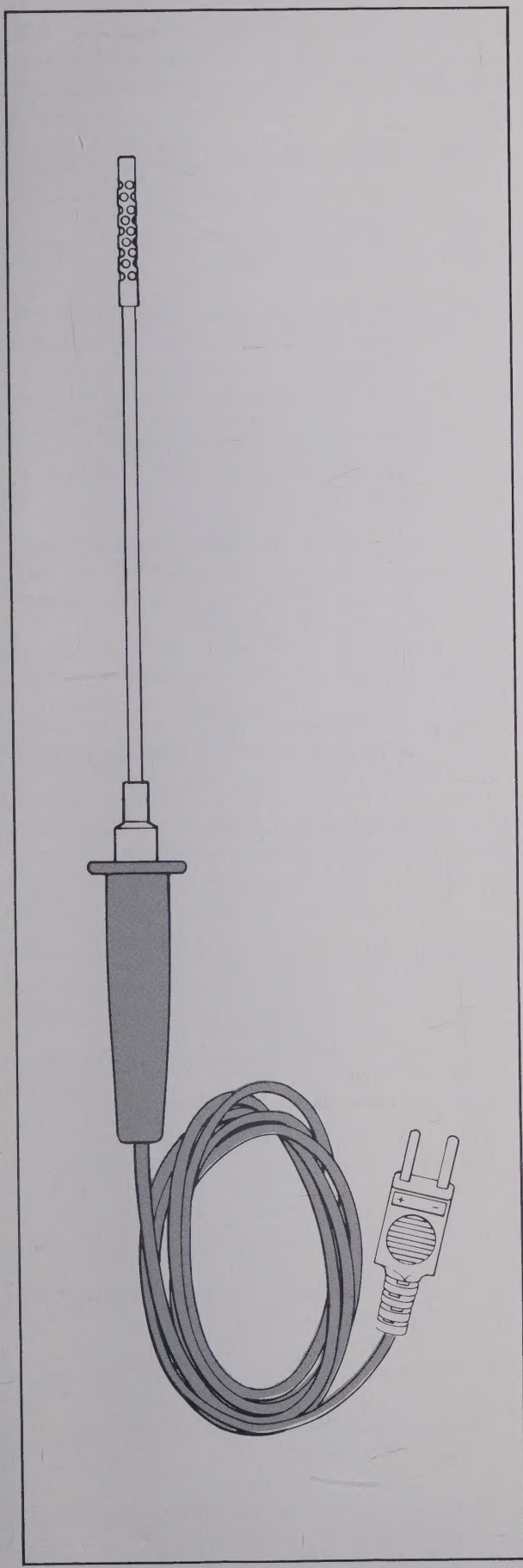
SCALE CONVERSIONS

Use the following equation to convert °C to °F:

$$(°C \times 1.8) + 32 = °F$$

Use the following equation to convert °F to °C:

$$(°F - 32) \times 0.5556 = °C$$



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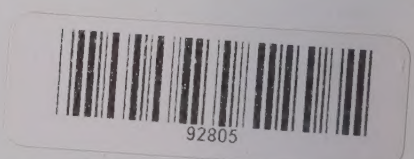

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